

# Microbiology

## Graduate Group

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A Survival Guide for Students,  
Faculty, & Graduate Advisors  
2017-2018

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# OVERVIEW: THE STEPS TO PH.D.

## **Before Arriving on Campus**

Prior to arrival, MGG graduate students will receive a welcome packet via email with information on:

- Financial Aid\*
- Funding\*\*
- Residency
- Housing and Davis Transit
- Orientation Events- First week of Fall Quarter
- Course Enrollment (12 units)
- Setting up Laboratory Rotations
- Name of Academic Advisor

Group Chair:

- Determines financial aid packages
- Composes the above with the help of the Coordinator
- Helps the Student Welfare & Advising committee organize Orientation week

MGG Coordinator:

- Helps organize the Orientation week schedule
- Serves as the primary contact for answering new student questions
- Assembles orientation packets to be provided at the Orientation

Student Welfare & Advising Committee:

- Helps organize the Orientation week schedule
- Plans orientation meeting and first week schedule

*\*All Graduate students who are U.S. Citizens or Eligible Non-Citizens are required to apply for financial aid by completing the Free Application for Federal Student Aid (FAFSA) or the California Dream Act Application. UC Davis will use the information you provide to determine your need and to provide you with financial aid (if eligible). Information on how to apply is located on the UC Davis Financial Aid and Scholarships [webpage](#) for graduate students.*

*\*\* Students' tuition, fees, and stipend (\$30,436.49/year) are funded by the MGG program for the first two quarters. After finding a home laboratory, tuition, fees, and stipend are covered typically by fellowships, working as a graduate student researcher (GSR), or teaching assistant (TA).*

## **Orientation to the Graduate Program**

Typically, on the first day of the Fall Quarter there will be two orientation meetings for the first-year students.

The first meeting will be run by the Chair, the Master Advisor, and the Graduate Coordinator. Students will be informed of:

1. General information about the MGG Graduate Program
2. The schedule of activities for the first week
3. The need to complete enrollment for the Fall Quarter

4. Important financial information: how to get their paycheck, funding options after rotations, financial aid
5. Instructions for how to apply for California Residency (if applicable)
6. Instructions for meeting with their Academic Adviser

The second meeting with the Rotation Course Instructors will cover the following:

1. Rotation Course goals, expectations, schedule, and syllabus
2. Setting up rotations #3 and #4

Group Chair:

- Helps schedule the orientation meetings
- Presents MGG information to students

MGG Coordinator:

- Prepares the file to include a PhD check list
- Assist with the scheduling of the student meeting with the Academic Advisor

Master Advisor:

- Assign students and Academic Advisors
- Discuss what is covered in meetings between students and their advisors, including but not limited to: undergraduate preparation and the need for any additional remedial courses, course schedule for the Fall Quarter, and assessment of research interests

## **MGG Advising**

Graduate Academic Advisors are members of the MGG faculty group whose role is to advise students about all aspects of their graduate education. This role is distinct from that of the major professor, who guides the student's research and serves as chair of the student's thesis or dissertation committee. The graduate advisor acts as the student's first source of academic information and provides assistance with fulfilling MGG requirements. This includes choosing a major professor (PI), planning coursework (including any needed to fill in gaps in a student's coursework background), preparing for the qualifying exam (QE) and conducting annual reviews of progress. Academic advisors approve and sign petitions such as those for Planned Educational Leave (PELP) and filing fee status as well as forms for advancement to candidacy. A student should turn to the academic advisor should problems arise between student and major professor.

During the first two weeks, it is the charge of the Graduate Advisor, in collaboration with the student, to discuss and develop an academic plan for the next two years in order to satisfy the MGG requirements and prepare the student for the qualifying exam (See page 7 & 14). Students meet with their advisors upon entering MGG, quarterly for advice during the first year, and at least once a year thereafter to review progress and complete reports for Graduate Studies.

It should be emphasized that students have several sources of advice and help available *at all times*, including the:

- |                    |                   |                        |
|--------------------|-------------------|------------------------|
| • Major Professor  | • MGG Chair       | • UCD Student Health & |
| • Academic Advisor | • MGG Coordinator | Counseling             |

Note: Only the Academic Advisor has signatory rights, including waivers of S/U grading, etc.

## **MGG Progress Reports**

Every spring quarter Graduate Studies requires a progress report for each student. The goal of the progress report is to encourage communication between students, professors, and advisors in order to clarify expectations and track progress. Having these discussions greatly benefits all parties. The student, Academic Advisor, and Major Professor (if the student has joined lab) must sign the report. Progress reports must be filed with Graduate Coordinator by the *end of June* (see also page 13).

Please review the following carefully.

- **First and Second-year students:** meet with your Academic Advisor and Major Professor to discuss the following
  - First-years: Joining a lab and that the Major Professor and student agree on how the student will be supported for the remainder of their tenure in the Major Professor's laboratory\*\*\*
  - Second-years: Any remaining requirements that must be completed before the QE (clearly state these requirements on the progress report document), topics for the QE, and possible QE examiners (see page 7 & 14)
  - Complete, sign, and date the Graduate Studies Annual Progress Report - This report informs the student of the remaining steps necessary to attain the degree and assesses progress as satisfactory, unsatisfactory, or marginal. The student initially fills out the report with the Major Professor, who evaluates progress, explains the evaluation, and signs the report (Major Professor please sign on the Committee Chairperson line as you will serve as the chair of the student's thesis or dissertation committee). The student then takes this form to the Academic Advisor, who reviews and discusses the student's progress to ensure that the student clearly understands the necessary requirements for degree completion (Ex: QE prep and/or Advancing to Candidacy and forming a dissertation committee).
- **Students Advanced to Candidacy:** meet with your Academic Advisor and Dissertation Committee to discuss the following
  - Complete, sign and date the MGG Dissertation Committee Report - This is a 1-page form summarizing the committee's assessment of progress and recommendations for the next year. In addition, the student must write a 2-page summary of the previous year's work and future goals. This summary must be sent to dissertation committee 1 week before the committee meeting. Yearly meetings of the student and dissertation committee are required, and the MGG Dissertation Committee Report must be filed with the MGG Coordinator and Academic Advisor after each meeting.
  - Complete, sign, and date the Graduate Studies Annual Progress Report – This report informs the student of the remaining steps necessary to attain the degree and assesses progress as satisfactory, unsatisfactory, or marginal. The student initially fills out the report together with the Major Professor, who evaluates progress, explains the evaluation, and signs the report. The student then takes this form and the MGG Dissertation Committee Meeting Report to the Academic Advisor, who reviews the reports, discusses the student's progress, and ensures that the student clearly understands what is necessary to complete the degree.

- **Important forms** are located on the Graduate Studies website under Faculty & Staff Resources- Forms & information.
  - The QE Application [form](#) (turn in several months before scheduled QE)
  - The Advancement to Candidacy [form](#) – Plan B (turn in after passing QE)

MGG Coordinator:

- Prepares and sends progress report forms to students by the start of Spring Quarter
- Remind students periodically that the reports must be filed
- Notify the Academic Advisor and Major Professor if the report is not filed in a timely manner
- Ensure the progress report is completed and all signatures have been obtained
- Files required reports with Graduate Studies
- Maintains information on TA-ships
- Reminds students to Advance to Candidacy

Academic Advisor:

- Assess student progress carefully
- Documents on the progress report any requirements left for degree
- Signs the progress report

Major Professor:

- Makes clear his/her plans to support the graduate student. This should be discussed before a student joins the lab, while reviewing/signing new lab paperwork, and during progress report meetings\*\*\*
- Fills out the Graduate Studies Annual Progress Report and discusses the progress with student

Graduate Student:

- Schedules meetings with both the Academic Advisor and Major Professor
- Asks both Academic Advisor and Major Professor to complete and sign report(s)
- Returns the signed progress report(s) to the Graduate Coordinator by end of June
- Files QE application with Graduate Studies several months before scheduled QE
- Files to Advance to Candidacy as soon as possible after passing QE

\*\*\* If TA-ships will be necessary for part or all of the financial support, the student must apply for TA positions and be aware of the deadlines for applications. Information on [Student employment](#) is located on the Graduate Studies website under Resources- Student Employment. Please contact the Coordinator for information on where MGG students have TA-ed in the past. Please note MGG students should be receiving the full stipend as stated in the current MGG Compensation Plan. Faculty should supplement student stipends up to the Compensation Plan whenever possible.

## **Qualifying Exam/Advancement to Candidacy (Fall Year Three)**

To be eligible for the qualifying examination, the student must have completed all MGG course requirements, removed any deficiencies on the transcript, and attained at least a 3.2 GPA in all work undertaken while in graduate standing. The QE must be taken by the end of fall quarter of the student's third year. The candidate must have conducted a minimum of three months experimentation on the proposed thesis research project prior to the examination and must be registered during the quarter in which the qualifying exam is taken. (See also page 14).

After passing the QE, the student is required to form his/her dissertation committee and Advance to Candidacy immediately by filing the Advancement to Candidacy [form](#) – Plan B with the Graduate Studies Office. This document is signed by the Chair of the Qualifying Examination Committee (ie the Major Professor), the student, and the Academic Advisor. This document requires the assignment of a Dissertation Committee, and this committee must be approved by the Graduate Advisor (as indicated by their signature) and Graduate Studies. Students should discuss forming their dissertation committee with their Major Professor and Academic Advisor and then formally ask faculty to serve on their committee.

A student must be advanced to candidacy by the tenth quarter of academic enrollment to be eligible for continued appointment as a graduate student researcher or teaching assistant. Also international students should remember that their tuition is reduced considerably after they file the papers for Advancement to Candidacy (See the UCD Graduate Studies website- [NRST Waiver/Fellowship Programs](#)).

## **Completion of the Requirements for the Ph.D. Degree**

- **Dissertation:** The research conducted by the student must be of such character as to show ability to pursue independent research. The dissertation reports a scholarly piece of work of publishable quality that solves a significant scientific problem in microbiology. It must be approved and signed by the dissertation committee before it is submitted to Graduate Studies for final approval.

The dissertation must be submitted to each member of the dissertation committee at least one month before the student expects it to be signed. Informing committee members of progress as writing proceeds helps the members to plan to read the dissertation and provide feedback within this time frame.

The dissertation must be filed in a quarter in which the student is registered or on filing fee. Instructions on preparation of the dissertation and a schedule of dates for filing the dissertation in final form are available on Graduate Studies website- [Degree Candidates](#).

- **Exit Seminar:** Each student must present a seminar on the dissertation research. The seminar is arranged through the Major Professor and advertised by the MGG Coordinator. Please email the MGG Coordinator 2-4 weeks before your exit seminar with the following information:
  - Name
  - Title of Dissertation/Exit Seminar
  - Major Professor
  - Date, Time, and Location of Exit Seminar
- **Scheduling an Appointment with Graduate Studies:** After completion of all degree requirements, students should [prepare and file their dissertation](#), complete the necessary [forms](#) for Graduate Studies, and schedule an appointment with our Student Affairs Officer in Graduate Studies (Laura Young).
- **Time to Ph.D. Degree:** A student should plan on at least 5 years to satisfy all requirements of the degree. Normative time, measured from the time a student begins graduate study in MGG is ~6 years.



# **MICROBIOLOGY GRADUATE GROUP**

## **Ph.D. and M.S. DEGREE REQUIREMENTS**

Revised: October 24, 2014

Graduate Council Approval: March 17, 2016

Updated Course Names & Links: July 14, 2017

### **PhD Degree Requirements**

#### **1) Admission Requirements**

Admission to the Microbiology Graduate Group (MGG) is open only for the fall quarter. It is the applicant's responsibility to ensure that all application materials are submitted to the on-line application system by the deadline of December 15<sup>th</sup> of the previous year.

Admission requires an undergraduate degree (B.S. or B.A.) in a biological science. Students must also demonstrate an aptitude and enthusiasm for research, which should include active participation in an independent research project supervised by a faculty member.

A GPA of 3.0 or greater (on a 4.0 scale) for undergraduate courses is generally required. GRE scores from the general test (verbal, quantitative, and analytical) must be submitted. UC Davis Graduate Studies mandates that international students who have not studied at an institution where English was the language of instruction must obtain the minimum university required score on the TOEFL or IELTS before applying for admission.

#### **A. Prerequisites**

Candidates should have taken course work in most of the following areas: calculus (MAT 17A-C), general physics (PHY 7A-C), general chemistry (CHE 2A-C), organic chemistry (CHE 118 A-C), biochemistry (BIS 102-103) with a laboratory (MCB 120L), general genetics (BIS 101), general biology with a laboratory (BIS 2A-C), and general microbiology (MIC 102) with a laboratory (MIC 102L). Upper division courses in cell biology (BIS 104), microbial physiology (MIC 140) and genetics (MIC 150), virology (MIC 162 or PMI 128), or immunology (MMI 188 or PMI 126) are also encouraged.

#### **B. Deficiencies**

Course work deficiencies should be made up by the end of the first academic year following initial enrollment by taking courses approved by the academic advisors and earning a letter grade of B or better.

#### **C. Transfer Students:**

Requests to transfer into the MGG program will be reviewed by the Admissions committee, whose recommendation will be considered by the Executive Committee. All students admitted to the MGG Ph.D. program from another graduate institution or another UC Davis graduate program must demonstrate proficiency in general subject matter equivalent to MGG students already enrolled at UC Davis. The graduate advisor will determine whether a transfer student has taken equivalents of MGG-required courses at another institution. If not, the student must take the required courses at UC Davis. The graduate advisor will prepare a report to the student and the Dean of Graduate Studies specifying which portion of the degree requirements previously met at another institution will be accepted in partial fulfillment of the MGG requirements and which degree requirements remain to be fulfilled at UC Davis. A transfer student is required to take an MGG oral qualifying examination. The student must have a UC Davis GPA of 3.2 to take the qualifying examination.

## 2) Dissertation Plan

The degree of Doctor of Philosophy is given under dissertation Plan B which specifies a three member (minimum) dissertation committee, and an optional final oral examination (made on an individual student basis by the dissertation committee). All students are required to present an exit seminar.

## 3) Course Requirements: 31 units

### a) Core courses (a list is presented in Attachment 1): 14 units

The following required core courses must be completed with a grade of B- or better unless the course is offered only S/U:

MIB 200A Microbial Biology (3 units)

BCB 211 Macromolecular Structure and Interactions (3 units)

or MIC 215 Recombinant DNA (3 units)

MMI 200D Mechanisms for microbial interactions with hosts (3 units)

BCB 214 Molecular biology (3 units)

Two non-participatory seminars (fall, winter 1<sup>ST</sup> year)

MIC 291 OR MMI 291

All of the core course requirements can be completed within one year.

### b) Lab rotations: 10 units

MIB 201L- Advanced microbiology laboratory rotations (5 units), twice for 10 units total.

Students must participate in four, 5-week rotations in a minimum of three different labs during fall and winter quarters of the first year. At the end of each rotation, each student will give a short oral presentation on the project to the other first-year students, the instructor in charge and any others who wish to attend. The student will also submit a short written report.

### c) Elective courses (a list of potential courses is presented in Attachment 2): 3 units

At least 3 units of a graded, graduate elective course(s) to be selected in consultation with the academic advisor and major professor. The required elective course(s) should provide depth in the student's area of research. Additional elective courses may be taken for depth and breadth. A list of potential elective courses is provided to all incoming students.

### d) Participatory seminars (a list of potential seminars is presented in Attachment 3): 4 units

Four graduate-level seminar courses in which each student makes at least one presentation during the quarter. At least three of the seminars must focus on critical analysis of the scientific literature. A list of potential seminars is provided to all incoming students.

### e) Summary

14 units of core coursework, 10 units of lab rotations, 3 units of electives and 4 units of participatory seminars are required for a total of 31 units.

All course requirements must be fulfilled by the end of the quarter in which the qualifying exam is taken.

Full-time students must enroll for 12 units per quarter including research, academic and seminar units. Courses that fulfill any of the MGG course requirements may not be taken S/U unless the course is

normally graded S/U. Once course requirements are completed, students can take additional classes as needed, although the 12 units per quarter are generally fulfilled with a research class (299) and perhaps seminars.

MGG students must have a GPA of 3.2 when taking the oral qualifying examination. Students must maintain a GPA of 3.0 or better to be eligible for appointment in a graduate student academic title. A minimum 3.0 GPA is required to be eligible for a living allowance/stipend fellowship, an in-state fee fellowship, or a non-resident tuition award. If the GPA falls below 3.0, the student is placed on academic probation. After two consecutive terms on academic probation, a student is subject to disqualification by the Dean of Graduate Studies.

A student earning a grade of C+ or lower in a required course will receive an "Unsatisfactory" progress evaluation and must retake the course and earn a grade of B- or better. If the student does not earn a grade of B- or better the second time, s/he will receive an "Unsatisfactory" evaluation. Two "Unsatisfactory" evaluations are grounds for disqualification from the MGG program.

#### **4) Special requirements**

Teaching experience: MGG strongly recommends that students acquire teaching experience by working as a Teaching Assistant for a quarter in a laboratory or discussion course. This experience is helpful in preparing for the oral qualifying examination. More advanced students considering careers involving teaching are encouraged to seek an opportunity to give a formal lecture in an undergraduate course, with guidance and feedback from the course instructor. Participatory seminars on developing teaching strategies are available from time to time and students are encouraged to attend.

#### **5) Committees**

- A. Admissions Committee: Once the completed application, all supporting material, and the application fee have been received, applications are submitted to the Admissions Committee. The committee is composed of 5 to 6 appointed graduate group faculty and a graduate student. Based on the committee's review of the entire application, a recommendation is made to accept or decline an applicant's request for admission. Applicants will be interviewed before acceptance into the program. The Admissions Chair functions as the admissions adviser and has signature authority; in this person's absence, the Chair of the MGG has signature authority. The recommendation is forwarded to the Dean of Graduate Studies for final approval of admission. Notification of admissions decisions is sent by Graduate Studies.
- B. Student Welfare and Advising Committee: Admitted students are assigned a graduate academic advisor who is one of six faculty members of the Student Welfare and Advising Committee. The advisors meet prior to the start of classes to review entering student transcripts, assess preparedness for the core graduate courses, and develop recommendations for any necessary remedial courses. Before the start of fall quarter classes, entering students meet with the MGG master advisor and other graduate advisors for an orientation where the MGG Ph.D. curriculum is presented. A plan for a first quarter course of study is presented at this meeting. The student may additionally elect to meet individually with his or her assigned advisor prior to the start of classes. It is recommended that students meet quarterly during the first year with their advisors to design course plans that include the required core courses, elective courses, and participatory seminars. Advisors will recommend additional elective and seminar courses based on each student's proposed dissertation project and prior academic course work. After the first year, students meet with their academic advisors as necessary to sign forms, and at least once a year to review progress and complete reports to Graduate Studies.
- C. Qualifying examination committee: Five members of the MGG or other qualified faculty serve on the examination committee. The major professor, who will serve as chair of the student's dissertation

committee, may not serve on the qualifying exam committee. The candidate, together with the major professor, selects two members; ideally, these two members will also serve on the dissertation committee, but this is not required. The student must obtain the agreement of these individuals to serve in this capacity prior to submitting their names to the Educational Policy Committee. An additional three members of the MGG are selected by the Educational Policy Committee. The student may choose any one of the examination committee members who is a member of the MGG to serve as Chair. The student may review the list of examiners, and, with sufficient cause, the Educational Policy Committee may alter the membership of the qualifying examination committee. Within a week of its decision, the Educational Policy Committee informs prospective committee members of their appointment and ascertains their general availability. The recommended composition of the qualifying examination committee is then submitted to Graduate Studies, which appoints the committee in accordance with Graduate Council policy. (In June 2009, MGG was granted an exception to the requirement to have a member external to the Group on its students' QE committees.)

- D. Dissertation committee: Upon advancement to candidacy, a committee of three faculty members is appointed by the Dean of Graduate Studies to direct the student in the dissertation research and to approve the dissertation. The chair of the dissertation committee is the student's major professor, who must be a member of the MGG, and must be immediately involved with the planning and execution of the experimental work done to formulate the dissertation. The other two dissertation committee members need not be members of the MGG. The student's graduate academic advisor must approve the nomination of a committee member who is not in the MGG. If a nominee is not a member of Academic Senate or Academic Federation, then a current curriculum vitae must be submitted to Graduate Studies with a memo explaining why that person is best suited to be on the committee. Under certain circumstances, a committee member from outside the University of California who has special expertise and qualifications may be nominated to serve on a dissertation committee. The graduate advisor must submit a brief statement indicating the appointee's affiliation and title, degrees held, and describing the special expertise that cannot be duplicated on the campus. A curriculum vitae and letter from the nominated person indicating willingness to serve must also be submitted.

## 6) Advising Structure and Mentoring

The **Major Professor** is a faculty member belonging to MGG who supervises the student's research and dissertation. The major professor's laboratory is usually the setting for most of the student's research activities and the major professor serves as chair of the student's dissertation committee. The major professor advises on details of course work and other aspects of the academic program that are tailored to suit the individual student's programmatic needs and career goals. **Mentoring guidelines** from Graduate Council can be found in the MGG student handbook.

Selection of the major professor is normally accomplished by the end of the winter quarter of the first year, by mutual consent of the student and the intended major professor. The chair of MGG sends a letter to each first year student, which is copied to the academic advisor, requesting that the student identify a major professor who is willing to take the student into the laboratory and provide the necessary financial support. The MGG executive committee approves and makes final assignments upon confirmation of the major professor's agreement to accept and support the student.

A student may rotate through additional laboratories during spring quarter of the first year, if this is necessary to identify a major professor. Satisfactory progress during the first year in the MGG program depends upon assignment of a major professor by the end of spring quarter. A student needing to rotate further during the summer must petition the Executive Committee for permission to do so.

A student's **Graduate Advisor** is an MGG faculty member appointed by the group chair to the Student

Welfare and Advising committee. The graduate advisor acts as the student's first source of academic information and provides assistance with fulfilling the requirements of the MGG. This includes choosing a major professor, planning coursework (including any courses necessary to fill in gaps in background), preparing for the qualifying exam and conducting annual reviews of progress. Graduate advisors approve and sign petitions such as those for Planned Educational Leave and filing fee status as well as forms for advancement to candidacy. The graduate advisor may not be the student's major professor. A student should turn to the graduate advisor should problems arise with the major professor.

Students meet with their graduate advisors upon entering the MGG, quarterly for advice during the first year, as necessary to obtain signatures on forms, and at least once a year to review progress and complete reports to Graduate Studies.

The **Master Advisor** for MGG is appointed by the Dean of Graduate Studies to serve as a deputy in matters affecting individual graduate students and their academic programs. The Master Advisor in MGG chairs the Student Welfare and Advising Committee, oversees the individual graduate advisors, and provides uniformity in student advising. The master adviser maintains records of each student's performance.

## 7) Progress in the MGG Program

Graduate advisors must file an **annual progress report** with Graduate Studies on each student's progress towards a degree. The report informs the student of the remaining steps necessary to attain the degree and assesses progress as satisfactory, unsatisfactory, or marginal. The student initially fills out the report together with the major professor, who evaluates progress, explains the evaluation, and signs the report. The student then takes the Graduate Studies form and, if advanced to candidacy, a copy of the MGG dissertation committee meeting report, to a meeting with his or her graduate advisor. The advisor reviews the reports, discusses the student's progress, and ensures that the student clearly understands what is necessary to complete the degree.

When progress is satisfactory, the report is placed in the student's MGG file. Copies are sent to the student, the student's graduate advisor, and the student's major professor.

When progress is marginal (e.g. academic difficulties or inadequate progress on research), the graduate adviser must share the information with the student and the student's major professor. The graduate advisor informs the student in writing what must be done to regain satisfactory status. The graduate adviser sends the report to the MGG staff program assistant, who sends it to Graduate Studies to be placed in the student's file. Copies are sent to the student, the student's graduate advisor, and the student's major professor.

When progress is unsatisfactory (e.g. academic difficulties, insufficient progress on research, failure to fulfill previous recommendations to maintain satisfactory progress), the graduate adviser must share the information with the student and the student's major professor. The graduate advisor, MGG master advisor and major professor, and optionally the MGG chair, review the situation with the student and decide upon a course of action, which must be communicated to the student in writing. This information, along with a copy of the annual progress report, is sent by the graduate adviser to the MGG staff program assistant, who sends it to Graduate Studies to be placed in the student's file and also sends copies to the graduate advisor, the student, and the major professor. Graduate Studies places the student on academic probation. The Dean of Graduate Studies sends the student a notice delineating the work that must be completed to attain a satisfactory evaluation and the time limit for completing the work.

If the student fails to meet the requirements for satisfactory progress, the graduate advisor will request that Graduate Studies place a hold on the student's registration for the next quarter. If a student fails to meet the requirements specified in the letter from the Dean, the student is subject to disqualification from further study in the MGG program.

## 8) Qualifying Examination Requirements

To be eligible for the qualifying examination, the student must have completed all MGG course requirements, removed any deficiencies on the transcript, and attained at least a 3.2 GPA in all work undertaken while in graduate standing. The qualifying examination must be taken by the end of fall quarter of the student's third year (7<sup>th</sup> quarter). Exceptions to this deadline may be requested from the Chair of the Graduate Group. The candidate must have conducted a minimum of three months experimentation on the proposed thesis research project prior to the examination. The student must be registered during the quarter in which the qualifying exam is taken.

The purpose of the qualifying examination is to determine that: 1) the student has acquired sufficient knowledge, in breadth and depth, of microbiology and related areas, and 2) the student has identified a dissertation research topic that asks a significant question in microbiology. The latter includes demonstration that the student has completed a literature review of that topic, has identified a set of achievable goals and has designed appropriate experimental approaches to accomplish those goals. Basic knowledge and breadth requirements are further addressed in an alternative proposal.

Format of the examination: The exam consists of the presentation and defense of a dissertation research proposal and an alternate research proposal. A general knowledge of microbiology is expected and will be addressed by the committee during the exam. The **dissertation research proposal** should describe work that will provide a substantial and original contribution to the field of microbiology. The candidate develops this proposal in close consultation with the major professor. The **alternate proposal** is meant to challenge the candidate's creativity and establish his or her ability to identify a significant microbiological question and develop a rational approach to answering the question. To promote the acquisition of breadth in microbiology, the alternate project cannot be on a research topic currently or previously addressed in the student's home laboratory or on a topic the student has previously investigated in any laboratory. The main research subject of the alternate proposal must be a microbe. The subject and every aspect including approaches and techniques to be used must differ from those in the dissertation research. The student's work on the alternate proposal must be done independently of the dissertation advisor.

The candidate should develop an excellent understanding of the research projects and a thorough knowledge in any areas (existing literature, experimental approaches and procedural mechanics) directly associated with the projects. A general understanding of the fields of knowledge that represent integral portions of the projects is expected. In addition, the candidate should be prepared to answer questions concerning the experimental approach, including how the experimental approach will answer the questions posed in the objective(s), any potential experimental difficulties, and alternative approaches that could be used to achieve the desired aims.

### Pre-Proposals:

In December of the second year in the program, a candidate must complete a form listing titles for a dissertation proposal and an alternate proposal, as well as the names of two faculty members to serve on the oral examination committee, one of whom will be the Chair of the committee. The two members nominated by the candidate will usually become members of the Dissertation Committee. After the academic advisor has signed and dated the form, the candidate submits the form along with a one-page outline of each proposal to the MGG graduate program assistant. The candidate must submit this material by December 15<sup>th</sup>. The Educational Policy Committee reviews the proposal outlines no later than early January.

A. Pre-proposal for the projected dissertation research project

The dissertation research proposal should describe work that will provide a substantial and original contribution to the field of microbiology. You should develop this proposal in close consultation with your major professor.

A summary (**1 full page, excluding references**) of your dissertation research project will be submitted to the Microbiology Graduate Group Educational Policy Committee for review and approval. The format is that of an NIH postdoctoral fellowship proposal: 11 point Arial font, 0.5 inch margins.

Organize sections of the research pre-proposal to include: 1) Title; 2) Hypothesis (What idea are you testing?); 3) Background and significance (What is already known and why is the study important?); 4) Objectives (What do you intend to do?); 5) Experimental approach (How are you going to do the work and what have you already done?); 6) References.

B. Pre-proposal for an alternate research project conceived by the candidate.

The alternate project is meant to challenge your creativity and establish your ability to identify a significant microbiological question and develop a rational approach to answering the question. To promote the acquisition of breadth in microbiology, the alternate project cannot be on a research topic currently or previously addressed in your home laboratory or on a topic you have previously investigated in any laboratory. The approaches and techniques to be used must differ from those in the dissertation research. The proposal should serve as a foundation for a challenging and interesting exchange of ideas in the actual oral qualifying examination.

The alternate proposal must be completely different from the dissertation proposal in every way. The main research subject of the alternate proposal must be a microbe.

A summary (**1 full page, excluding references**) of your alternate research project will be submitted to the Microbiology Graduate Group Educational Policy Committee for review and approval. **Proposals that are deemed to be too close primary proposal (or other research in the major professor's laboratory) will not be approved by the Educational Policy Committee.** The format is that of an NIH postdoctoral fellowship proposal: 11 point Arial font, 0.5 inch margins. 1) Title; 2) Hypothesis (What idea are you testing?); 3) Background and significance (What is already known and why is the study important?); 4) Objectives (What do you intend to do?); 5) Experimental approach (How are you going to do the work); 6) References. The formatting requirements will be strictly enforced; proposals not adhering to them will be returned without review.

Proposals:

Upon approval of the pre-proposals, the student prepares expanded proposals (not to exceed 4 pages, excluding references and figures) using the following format. Proposals must be submitted to the members of the qualifying examination committee a minimum of one week prior to the examination date.

Your major professor should be closely involved in preparation of the thesis research proposal, while development of the alternate proposal is to be done independently.

The format is that of an NIH postdoctoral fellowship proposal. Use NIH style format for proposals: 11 point Arial font, 0.5 inch margins. Sections of the research proposal should be organized as described below. **DO NOT EXCEED 4 PAGES FOR SECTIONS 2-5 below.** The formatting requirements will be strictly enforced.

**A. Title**

**B. Specific Aims:** What do you intend to do?

Start with a paragraph containing a synopsis of the general problem to be addressed and clearly stating the hypothesis to be tested. This is necessary for the specific aims to make sense. Then, list the specific aims.

**C. Background/Significance:** Why is the work important?

Briefly sketch the background to the proposal. Critically evaluate existing knowledge, and identify the gaps that the project is intended to fill. Concisely state the importance of the proposed research by relating the specific aims to the broad, long-term objectives.

**D. Preliminary Studies:** What has already been done?

Thesis research: describe the work you have already accomplished that is relevant to the proposal or the work in your lab that forms the rationale for your proposal. **Alternate proposal: describe the work done by others that forms the rationale for the proposal.**

**E. Experimental Design:** How are you going to do the work?

List the aims again. Under each aim, explain the rationale for each experiment necessary to accomplish the aim, the experimental design, the interpretation of different types of results, and necessary methods (without intricate details). Include the means by which data will be collected, analyzed and interpreted. Describe any new methodology and its advantage over existing methodologies. Discuss the potential difficulties and limitations of the proposed procedures along with alternative approaches to achieve the aims. Provide a tentative sequence for the investigation. At the end, summarize how your experimental results will test your hypothesis.

**F. References:** Quote references in the text (Author[s], date) and then collect them in alphabetical order at the end. Each citation must include the names of all authors, title of the article, name of the book or journal, volume number, page numbers and year of publication.

Five key references should be highlighted in each proposal.

Qualifying examination committee: Refer to Page 11, item C

Examination Procedures:

The candidate establishes an examination date that can be accommodated by all examiners. The candidate is encouraged to communicate individually with the committee members about their expectations about the examination. These meetings are not pre-examinations of the student on the research proposals. Student should not ask for, nor should committee members provide, comments on weaknesses, potential problems, and errors in the research proposals

The qualifying examination consists of the dissertation research proposal, the alternate research proposal and breadth questions about general microbiology. For each proposal, the candidate is given a short time to present a chalk talk outlining the overall objectives and experimental approach. The committee's evaluation of dissertation proposals is to be based on the candidate's research promise, not on research accomplishments or publications to date. Breadth is addressed in association with the dissertation proposal and is an emphasis during the examination on the alternate proposal. Material taught in the core courses and covered in electives the student has taken is part of breadth in microbiology.



The chair of the qualifying examination committee is expected to ensure that the student receives a fair examination and that short breaks are taken as appropriate. Generally, the exam lasts no longer than 3 hours. Both portions of the exam must be completed.

Qualifying Examination Evaluation. The student's previous academic record, performance on specific parts of the examination and overall performance/potential for scholarly research are evaluated in determining the outcome of the examination. One of three outcomes is reached by unanimous decision of the examination committee. "Pass" advances the student to candidacy for the Ph.D. (no conditions may be appended to this decision). "Not Pass" means that the student is required to retake all or part of the examination or to satisfy a particular requirement(s) established by the committee within a specified time frame. When a second examination is mandated, it will be administered by the same committee and must be scheduled within a specified time frame. The conditions must be described in the report of the chair of the qualifying examination committee and also communicated to the student. Satisfactory completion of a second examination or specified requirement will result in a "Pass" and the student may advance to candidacy. Only one retake of the qualifying examination is allowed. "Fail" on the first or second attempt at the qualifying examination means that the student is recommended for disqualification from the MGG Ph.D. program.

#### **9) Advancement to Candidacy**

The student is eligible for Advancement to Candidacy after successfully completing all graduate program requirements except for the dissertation and exit seminar, and after passing the qualifying examination. A student's application for advancement to candidacy form is signed and dated by the chair of the qualifying examination committee. The student, in conjunction with the major professor, identifies two other faculty members to serve on the dissertation committee, obtains their consent, and obtains signatures of the major professor and the graduate advisor. After payment of the candidacy fee, the student files the form with Graduate Studies. The committee of three faculty members is appointed by the Dean of Graduate Studies to direct the student in the dissertation research and to approve the dissertation.

MGG students are expected to advance to candidacy by the end of their seventh quarter of academic enrollment. A student must have advanced to candidacy by the beginning of the tenth quarter of academic enrollment to be eligible for continued appointment as a graduate student researcher or teaching assistant.

#### **10) Dissertation Requirements**

The degree of Doctor of Philosophy is given under dissertation Plan B, which specifies a three member (minimum) dissertation committee, and optional final oral examination (made on an individual student basis by the dissertation committee). All students are required to present an exit seminar.

Dissertation committee: Refer to page 12, item D

##### Dissertation committee meetings:

Yearly meetings of the student and dissertation committee are required. A written report must be filed with the MGG staff program assistant and academic advisor after each meeting. The report includes a 1-page form summarizing the committee's assessment of progress and recommendations for the next year. In addition, the student must write a 2-page progress report summarizing the work of the previous year and listing future goals. The report must be sent to dissertation committee members within 1 week before the committee meeting.

##### Dissertation:

The research conducted by the student must be of such character as to show ability to pursue independent research. The dissertation reports a scholarly piece of work of publishable quality that solves a significant

scientific problem in microbiology and is carried out under the supervision of a member of MGG while the student is enrolled in the MGG program. The chair of the dissertation committee must be a member of the MGG and must be immediately involved with the planning and execution of the experimental work done to formulate the dissertation. The major professor's laboratory is the setting for most of the student's research activities, unless an alternative site and immediate supervisor are approved in advance by the MGG Executive Committee.

The dissertation must be submitted to each member of the dissertation committee at least one month before the student expects to submit to graduate studies, in order to make requested revisions. Informing committee members of progress as writing proceeds helps the members to plan to read the dissertation and provide feedback within this time frame. The dissertation must be approved and signed by the dissertation committee before it is submitted to Graduate Studies for final approval.

The dissertation must be filed in a quarter in which the student is registered or on filing fee. Instructions on preparation of the dissertation and a schedule of dates for filing the dissertation in final form are available from Graduate Studies; the dates are also printed in the UC Davis General Catalog and in the Class Schedule and Registration Guide issued each quarter.

#### Exit seminar:

Each student must present a public seminar on the dissertation research. The seminar is arranged through the major professor and advertised by the MGG office. Satisfaction of this requirement should be verified by the dissertation committee chair.

### **11) Normative Time to Degree:**

A student should plan on at least 5 years to satisfy all requirements of the degree. Normative time to advancement to candidacy is 7 quarters. Normative time to complete the Ph.D., measured from the time a student begins graduate study in the MGG, is 6 years.

### **12) Typical Time Line and Sequence of Events**

#### **First Year**

Fall MIB 200A Microbial Biology (3 units)  
BCB 211 Macromolecular Structure and Interactions or MIC 215 - Recombinant DNA (3 units)  
MIB201L - Research rotations (5 units)  
Participatory or non-participatory seminar (1 unit)

Winter MMI 200D - Mechanisms for microbial interactions with hosts (3 units)  
MIB201L - Research rotations (5 units)  
Participatory seminar (1-2 units)  
Elective course, possibly (3 units)

***Students should join a lab at the end of this term. Notify the staff program assistant of your identification of a major professor.***

Spring BCB 214 Molecular biology (3 units)  
Participatory seminar (1-2 units)  
Elective course (3-4 units)  
Research (MIB 299 or home dept. 299) or additional 201L (Research rotations)

***All students are expected to have joined a lab by the end of this quarter to make satisfactory progress in the program***

June 30 Annual progress assessment of coursework and research by major professor and graduate adviser. Reviewed by MGG Executive Committee.

Important:

- Complete core courses with grades of B- or better before the oral qualifying exam.
- At least 3 units of graded graduate elective courses and 4 participatory seminars are required before you take your oral qualifying exam.
- A non-participatory seminar (e.g. MIC 291, MMI 208, etc.) where you will hear about research of guest speakers is suggested every quarter.
- **You must have a 3.2 GPA to be eligible to take your oral qualifying exam.**

### **Second Year**

Fall Submit pre-proposals for dissertation research and alternate topic including orals proposals form.  
Nominate two members of qualifying exam committee  
Participatory seminar (total of 4 required) / Elective  
Dissertation research

Winter/Spring Participatory seminar (total of 4 required) / Elective  
Dissertation research

Spring/Summer Annual progress report due June 30  
Prepare and take oral qualifying exam.  
Finalize dissertation committee, file advancement to candidacy form.  
Continue dissertation research.  
Meet with dissertation committee.

**Third through Fifth Years** Continue dissertation research.

Annual dissertation committee meeting.

Annual progress reports due May 30.

*Fifth year and beyond: on the dissertation committee report, include a plan and a timetable for completion of degree requirements.*

**Fifth or Sixth Year** Submit dissertation to committee.

Exit seminar on dissertation research.

File dissertation with Graduate Studies.

### **13) Sources of Funding**

During their first two quarters, students are supported financially through MGG funding (block grant) plus internal and external fellowships. Thereafter, students are supported through a combination of internal and external fellowships, training grant stipends, graduate student researcher positions with their major professors, and teaching assistantships.

### **14) PELP, In Absentia, and Filing Fee Status**

Information about the [Planned Educational Leave Program](#) (PELP), [In Absentia](#) (reduced fees when conducting research out of state), and [Filing Fee](#) status can be found on the Graduate Studies website (<https://grad.ucdavis.edu> ).

**15) Leaving the Program Prior to Completion of the Ph.D.**

Should a student leave the program prior to completing the requirements for the Ph.D., he or she may be eligible to receive the M.S. degree if all the requirements have been fulfilled (see Master's requirements). The Change of Degree Objective [form](#) is available from Graduate Studies.

Office of the University Registrar [website](#) also has information on Leave from the University.

## MASTER'S DEGREE REQUIREMENTS

### 1) Admissions

Students are accepted into the M.S. program in Microbiology by two routes. The first is by directly applying for admission under the supervision of a specific mentor. The mentor must provide the MGG admissions committee with a letter stating willingness to accept the student. If accepted into the program, the applicant will be informed that the MGG does not assume responsibility for financial support. All costs are the responsibility of the applicant.

The second route occurs when a Ph.D. student's plans or circumstances change so that an M.S. degree is desirable. To initiate this change, the student must file a Petition For Change of Degree Objective.

Admission requires an undergraduate degree (B.S. or B.A.) in a biological science, which should include adequate course work in most of the following areas: calculus, general physics, general chemistry, quantitative analysis, organic chemistry, biochemistry with a laboratory, general genetics, general biology with a laboratory, and general bacteriology or microbiology with a laboratory. Upper division courses in cell biology, microbiology, microbial physiology and genetics, and immunology are also encouraged. Students must also demonstrate an aptitude and enthusiasm for research, which should include active participation in an independent research project supervised by a faculty member.

A GPA of 3.0 or greater (on a 4.0 scale) for undergraduate courses is generally required. GRE scores from the general test (verbal, quantitative, and analytical) must be submitted. UC Davis Graduate Studies mandates that international students who have not studied at an institution where English was the language of instruction must obtain the minimum university required score on the TOEFL or IELTS before applying for admission.

#### A. Prerequisites

Candidates should have taken course work in most of the following areas: calculus (MAT 17A-C), general physics (PHY 7A-C), general chemistry (CHE 2A-C), organic chemistry (CHE 118 A-C), biochemistry (BIS 102-103) with a laboratory (MCB 120L), general genetics (BIS 101), general biology with a laboratory (BIS 2A-C), and general microbiology (MIC 102) with a laboratory (MIC 102L). Upper division courses in cell biology (BIS 104), microbial physiology (MIC 140) and genetics (MIC 150), virology (MIC 162 or PMI 128), or immunology (MMI 188 or PMI 126) are also encouraged.

#### B. Deficiencies

Course work deficiencies should be made up by the end of the first academic year following initial enrollment by taking courses approved by the academic advisors and earning a letter grade of B or better.

### 2) Master's Degree and Master's Plan

The MGG offers the Master of Science degree under Plan I (Thesis). Plan I specifies a minimum of 30 units of graduate and upper division courses (the 100 and 200 series only) and a thesis. At least 12 of the 30 units must be graduate work in the major field.

### 3) Course Requirements: 30 units

#### A. Core courses (a list is presented in Attachment 1): 14 units

The following required core courses must be completed with a grade of C or better unless the course is offered only S/U:

MIB 200A Microbial Biology (3 units)

MIC 215 - Recombinant DNA (3 units) or MCB 211-[Macromolecular Structure and Interactions](#) (3 units)

MMI 200D Mechanisms for microbial interactions with hosts (3 units)

BCB 214 (or its equivalent replacement) Molecular biology (3 units)

All of the core course requirements can be completed within one year.

**B. Elective courses** (a list of potential courses is presented in Attachment 2): **14 units**

To earn 30 units of credit, the M.S. student must take at least 14 additional units of coursework. At least 3 units of a graded, graduate elective course(s) must be selected in consultation with the academic advisor and major professor. This required elective course(s) should provide depth in the student's area of research.

Additional graduate or upper division undergraduate elective may be taken for depth and breadth. A list of potential elective courses is provided to all incoming students. Research units (xxx 299) may

**C. Participatory seminars** (a list of potential seminars is in Attachment 3): **2 units**

Two graduate-level seminar courses focusing on critical analysis of the scientific literature, in which each student makes at least one presentation during the quarter, are required. A list of potential seminars is provided to all incoming students.

**D. Summary:**

A total of 30 units of upper division (100-series) and graduate-level (200-series) courses is required. At least 19 units (core courses, elective course, and participatory seminars) of the 30 must be graduate work specified by MGG. Any deficiencies in course work must be rectified with a grade of B- (or Satisfactory) or better prior to the submission of the thesis. The student must have an overall GPA of 3.0 to advance to candidacy and to file the thesis.

**4) Special Requirements**

There are no special requirements for completion of the MS degree.

**5) Committees**

- A. Admissions Committee: Once the completed application, all supporting material, and the application fee have been received, applications are submitted to the Admissions Committee. The committee is composed of 5 to 6 appointed graduate group faculty and a graduate student. Based on the committee's review of the entire application, a recommendation is made to accept or decline an applicant's request for admission. The Admissions Chair functions as the admissions adviser and has signature authority; in this person's absence, the Chairperson of the MGG has signature authority. The recommendation is forwarded to the Dean of Graduate Studies for final approval of admission. Notification of admissions decisions is sent by Graduate Studies.
- B. Student Welfare and Advising Committee: Admitted students are assigned a graduate academic advisor who is one of six faculty members of the Student Welfare and Advising Committee. The advisors meet prior to the start of classes to review entering student transcripts, assess preparedness for the core graduate courses, and develop recommendations for any necessary remedial courses. Before the start of fall quarter classes, entering students meet with the MGG master advisor and other graduate advisors for an orientation where the MGG curriculum is presented. A plan for a first quarter course of study is presented at this meeting. The student may additionally elect to meet individually with his or her assigned advisor prior to the start of classes. Students meet quarterly during the first year with their advisors to design course plans that include the required core courses, elective courses, and participatory seminars. The advisor will recommend additional elective and seminar courses based on the student's proposed dissertation project and prior academic course work. After the first year, students meet with their academic advisors to sign forms, and at

least once a year to review progress and complete reports to Graduate Studies.

- C. Thesis committee: When the student submits the advancement to candidacy form to the adviser for a signature, an accompanying letter from the major professor recommends two other faculty members to serve as additional members of the three-person thesis committee. The latter two faculty need not be members of the MGG. The topic of the thesis should be acceptable to all members of the committee when they agree to serve. The thesis committee is appointed by the Dean of Graduate Studies.

## 6) Advising Structure and Mentoring

The **Major Professor** is a faculty member belonging to MGG who supervises the student's research and thesis. The major professor serves as chair of the student's thesis committee and the major professor's laboratory is usually the setting for the student's research activities. The major professor advises on details of course work and other aspects of the academic program that are tailored to suit the individual student's programmatic needs and career goals. The major professor must be immediately involved with the planning and execution of the experimental work done to formulate the thesis. **Mentoring Guidelines** from Graduate Council can be found on the MGG and Graduate Studies websites.

Selection of the major professor occurs prior to enrollment for students applying to enter the M.S. program. The prospective mentor must provide the MGG admissions committee with a letter stating willingness to accept the student and to help the student identify sources of financial support.

A student's **Graduate Advisor** is an MGG faculty member appointed by the group chair to the Student Welfare and Advising committee. The graduate advisor acts as the student's first source of academic information and provides assistance with fulfilling the requirements of the MGG. This includes choosing a major professor, planning coursework (including any courses necessary to fill in gaps in background), and conducting annual reviews of progress. Graduate advisors approve and sign petitions such as those for Planned Educational Leave and filing fee status as well as forms for advancement to candidacy. The graduate advisor may not be the student's major professor. A student should turn to the graduate advisor should problems arise with the major professor.

Students meet with their graduate advisors upon entering the MGG, quarterly for advice during the first year, as necessary to obtain signatures on forms, and at least once a year to review progress and complete reports to Graduate Studies.

The **Master Advisor** for MGG is appointed by the Dean of Graduate Studies to serve as a deputy in matters affecting individual graduate students and their academic programs. The Master Advisor in MGG chairs the Student Welfare and Advising Committee, oversees the individual graduate advisors, and provides uniformity in student advising. The master adviser maintains records of each student's performance.

## 7) Advancement to Candidacy

Advancement to candidacy: The student must file an official application for Candidacy for the Degree of Master in Science (Plan I Thesis) after completing at least one-half of the course requirements for the degree and at least one quarter before completion of all degree requirements. The student must have a grade point average of 3.0 to be eligible for advancement. The candidacy application must be signed by the thesis chairperson (major professor) and the student's graduate adviser. Students are expected to advance to candidacy by the end of the sixth quarter of enrollment.

## 8) Thesis Requirements

Thesis committee meetings: The candidate and major professor should meet at least once a year with the other members of the thesis committee to discuss progress and any changes in research objectives.

Thesis: Research for the Master's thesis is to be carried out under the supervision of a faculty member of the MGG and must represent an original contribution to knowledge in microbiology. The thesis research must be conducted while the student is enrolled in the MGG program. The thesis is submitted to the thesis committee at least one month before the student plans to make requested revisions. All committee members must approve the thesis and sign the title page before the thesis is submitted to Graduate Studies for final approval.

The thesis must be filed in a quarter in which the student is registered or on filing fee. Instructions on preparation of the thesis and a schedule of dates for filing the thesis in final form are available from Graduate Studies; the dates are also printed in the UC Davis General Catalog and in the Class Schedule and Registration Guide issued each quarter.

A student must have a GPA of 3.0 for the M.S. degree to be awarded.

## 9) Normative Time to Degree

Students can complete all of the course work requirements within four quarters. Master's degree students typically fulfill the thesis requirement in two to three years (six to nine academic quarters).

## 10) Typical Time Line

### First Year

Fall MIB 200A -Microbial Biology (3 units)  
MIC 215 - Recombinant DNA (3 units) or MCB 211-Macromolecular Structure and Interactions 3 units)  
MIC 291 - Selected topics in microbiology (1 unit non-participatory seminar)  
or a participatory seminar (1-2 units)  
MIB 299 or home dept. 299 – Research (to bring total to 12 units)

Winter MMI 200D - Mechanisms for microbial interactions with hosts (3 units)  
Participatory seminar (1-2 units)  
Elective course, possibly (3 units)  
MIB 299 - Research (to bring total to 12 units)

Spring BCB 214 (or its equivalent replacement) - Molecular biology (3 units)  
Participatory seminar (1-2 units)  
Elective course (3-4 units)  
MIB 299 - Research (to bring total to 12 units)

June 30 Annual progress assessment of coursework and research by major professor and graduate adviser.

Important:

- Complete core courses with grades of C or better.
- At least 3 units of graded graduate elective courses and 2 participatory seminars are required.
- A non-participatory seminar (e.g. MIC 291, MMI 208, etc.) where you will hear about research of guest speakers is suggested every quarter.
- **You must have a 3.0 GPA to be eligible to advance to candidacy for the M.S. and to be awarded the M.S.**



## **Second Year**

Fall     File advancement to candidacy form; nominate two members of thesis committee.  
Participatory seminar (total of 2 required) / Elective  
Thesis research

Winter/Spring   Participatory seminar (total of 2 required) / Elective  
Thesis research  
Meet with thesis committee.  
Annual progress report due June 30

Summer   Thesis research

**Second – third year**   Finish thesis research.

Submit thesis to committee.

File thesis with Graduate Studies.

### **11) Sources of Funding**

MGG does not assume responsibility for financial support. All costs are the responsibility of the applicant.

**12) PELP, In Absentia, and Filing Fee status.** Information about the [Planned Educational Leave Program](#) (PELP), [In Absentia](#) (reduced fees when conducting research out of state), and [Filing Fee](#) status can be found on the Graduate Studies website (<https://grad.ucdavis.edu> ).

## **Course requirements for the Ph.D. in Microbiology**

**Core Courses** normally taken during the first year of the program:

### **Fall**

MIB 200A - (3 units) Microbial Biology

BCB 211- (3 units) Macromolecular Structure and Interactions or MIC 215 - Recombinant DNA

MIB 201L - (5 units) Laboratory Rotation Course - Laboratory Rotations 1 and 2

### **Winter**

MMI 200D - (3 units) Mechanisms for microbial interactions with hosts

MIB 201L - (5 units) Laboratory Rotation Course - Laboratory Rotations 3 and 4

### **Spring**

BCB 214 - (3 units) Molecular Biology

## **Graduate Electives**

Students are expected to take at least 3 units of graded graduate courses to be selected in consultation with the academic advisor and major professor. The required elective course(s) should provide depth in the student's area of research. They must be completed before the student takes the oral qualifying examination. Additional elective courses may be taken for depth and breadth; these may be taken at any time during the student's graduate career.

## **Participatory Seminars**

At least 4 units of participatory seminars are *required* before the student takes the oral qualifying examination. These are usually journal clubs and small-group seminars designed to engage students in a critical understanding of current literature in microbiology and related fields. At least three of the seminars must focus on critical analysis of the scientific literature. The student must make a presentation at least once during the quarter for the seminar to qualify as participatory. Because most seminar courses are only 1-2 unit(s) and help expose students to a wide-range of scientific literature, we highly encourage students to take at least four participatory seminars before the QE.

## **Non-Participatory Seminars**

Students are required to take two non-participatory seminars in their first year. We recommend students take MMI 291 (Topics in Microbiology & Immunology) during the Fall quarter and MIC 291 (Selected Topics in Microbiology) in Winter. Students are also encouraged to attend one of these seminars during Spring quarter.

## **Course requirements for the M.S. in Microbiology**

**Core Courses** normally taken during the first year of the program:

### **Fall**

MIB 200A - (3 units) Microbial Biology

BCB 211- (3 units) Macromolecular Structure and Interactions or MIC 215 - Recombinant DNA

### **Winter**

MMI 200D - (3 units) Mechanisms for microbial interactions with hosts

### **Spring**

BCB 214 - (3 units) Molecular Biology

## **Graduate Electives**

Students are expected to take at least 3 units of graded graduate courses to be selected in consultation with the academic advisor and major professor. The required elective course(s) should provide depth in the student's area of research. Additional elective courses may be taken for depth and breadth.

## **Participatory Seminars**

At least 2 participatory seminars are required. These are journal clubs and small-group seminars designed to engage students in a critical understanding of current literature in microbiology and related fields. The student must make a presentation at least once during the quarter for the seminar to qualify as participatory.

## **Non-Participatory Seminars**

Students are encouraged to take MMI 291 (Topics in Microbiology & Immunology) during the Fall quarter and MIC 291 (Selected Topics in Microbiology) in Winter. Students are also welcome to attend one of these seminars during Spring quarter.

### POTENTIAL GRADUATE ELECTIVE COURSES FOR MGG STUDENTS

The best source of information about courses is the [UC Davis General Catalog](http://registrar.ucdavis.edu), which is available on-line (registrar.ucdavis.edu). In the UCD Catalog, relevant courses are listed under departments (note that departments in the schools of Engineering, Medicine and Vet Medicine are sub-listed under “E,” “M” and “V,” respectively, in the catalog) or under graduate groups (e.g. Genetics, Immunology).

Graduate-level courses are numbered 200-299. Undergraduate, upper division courses are numbered 100-199. Many are good for background, especially in areas you might not have covered as an undergraduate. They will not count toward the requirement for 3 units of graded, graduate elective courses. Both graduate and upper division undergraduate courses are counted in your GPA.

[UC Davis Schedule Builder](#) is an on-line course registration tool. Confirm the availability of graduate courses, which may differ from the listings in the General Catalog. **\*\*Watch for new courses announced by e-mail\*\***

**\*\*Students should discuss selecting an elective with their Academic Advisor before registering.\*\***

Course #	Title	Quarter Offered: 2016-17 or (2017-18)
<b>Microbial Pathogenesis and Host Response</b>		
BCB 257	Cell Proliferation and Cancer Genes	F (F)
GGG 210	Horizontal Gene Transfer	F (F)
IMM 201	Introductory Immunology	F (F)
IMM 293	Current Concepts in Immunology	W (W)
IMM 294	Comparative Clinical Immunology	alternate years
IMM 297	Mucosal Immunology	(S)- alternate years
IMM 203	Cancer Immunology	alternate years
MIC 262	Advanced General and Molecular Virology	(F)- alternate years
MMI 215	Medical Parasitology	alternate years
MMI 280	The Endogenous Microbiota in Lifespan Health and Disease	S (S)
NUT 251	Nutrition and Immunity	W- alternate years
PHR 212	Epidemiology of the Zoonoses	alternate years
PLP 210	Biochemistry and Molecular Biology of Plant-Microbe Interaction	W
PLP 224	Advanced Mycology	S- alternate years
PLP 228	Plant Bacteriology	(F)- alternate years
PLP 230	Plant Virology	W- alternate years
PMI 270	Advanced Immunology	W (W)
<b>Microbial Physiology and Genetics/Applied and Environmental Microbiology</b>		
ECI 248	Biofilm Processes: Interface of Microbiological Sciences and Engineering	offered irregularly

FST 204	Advanced Food Microbiology	S (S)
FST 205	Industrial Microbiology	offered irregularly
MCB 263	Biotechnology Fundamentals and Applications	W (W)
MIC 200B	Advanced Bacteriology	offered irregularly
PLP 217	Molecular Genetics of Fungi	W- alternate years
PMI 214	Vector-Borne Infectious Diseases: Changing Patterns (ENT 214)	F (F)
SSC 211	Advanced Soil Microbiology	F- alternate years

### **Advanced Biochemistry, Cell Biology**

BCB 212	Cell Biology	W (W)
BCB 213	Developmental Biology	W (W)
MIC 276	Advanced Concepts in DNA Metabolism	(W) alternate years

### **Genetics, Genomics, Bioinformatics**

ECS 124	Theory and Practice of Bioinformatics [not graduate level]	(W)
GGG 201A	Advanced Genetic Analysis	F (F)
PHA 250	Functional Genomics: from Bench to Bedside (S)	S (S)

### **Methodology**

ANG 212	Sequence Analysis in Molecular Genetics	offered irregularly
APC 286	Basics of Microscopy and Cellular Imaging	S-alternate years
GGG 296	Scientific Professionalism and Integrity	F (F)
PMI 201	Integrative Pathobiology Core I	W (W)
STA 100	Applied Statistics for the Biological Sciences [not graduate level]	F W S Su (F W S Su)
STA 101	Advanced Applied Statistics for the Biological Sciences [not graduate level]	S (S)

Note: Students may also find the Research Ethics (RCR) Program very helpful even though it is not a registered course (<http://research.ucdavis.edu/policiescompliance/research-ethics-rcr-program/>).

## POTENTIAL PARTICIPATORY SEMINARS FOR MGG STUDENTS

Participatory = students must participate by making a presentation during the quarter. Focus is on critical analysis of the scientific literature.

May be a journal club, but must have a course designation and the student must present during the quarter. Offerings vary by quarter and year. Watch for e-mail notices each quarter. Check current class schedule and room directory on the registrar's web site.

Course #	Title	Quarter Offered: 2016-17 or (2017-18)
<b>Microbial pathogenesis and host response</b>		
BCB 298	Group Study	F W S (F W S)
ENT 291	Current Topics in Medical and Veterinary Entomology	F W S
FST 290	Seminar in Food Science (if appropriately structured)	F W S (F W S)
GGG 293	Seminar in Animal Genetics	S- alternate years
GGG 294	Seminar in Human Genetics	W- alternate years
GGG 295	Seminar in Molecular Genetics	F- alternate years
IMM 292	Immuno-toxicology Seminar	offered irregularly
IMM 296	Advanced Topics in Immunology	F (F)
MCB 295	Literature in Molecular and Cellular Biology	F W S (F W S)
MMI 210A	Critical Analysis of Contemporary Research on Animal Models of Human	alternate years
PBI 223	Special Topics in Scientific Method	F (F)
PMI 291A	Seminar in Immunology	F S (F S)
PMI 293A	Seminar in Infectious Diseases	F (F)
PLP 291	Seminar in Molecular Plant Pathology	F W (F W)
PLP 295	Seminar in Mycology	S (S)
SSC 290	Special Topics in Soil Science	F W S (F W S)
VME 225	Retroviral Pathogenesis Seminar/Journal Club	F W S (F W S)
<b>Microbial physiology and genetics/applied and environmental microbiology</b>		
GEL 250	Advanced Geochemistry Seminar	alternate years
MIC 274	Seminar in Genetic Recombination	offered irregularly
MIC 275	Seminar in DNA Repair and Recombination	W S (F S)
MIC 292	Seminar in Bacterial Physiology and Genetics	F W S (F W S)
VEN 270	Critical Evaluation of Scientific Literature	F S (F S)

## **GRADUATE GROUP IN MICROBIOLOGY BYLAWS**

### **Administrative Home: Medical: Microbiology & Immunology, Tupper Hall Submitted for Graduate Council Approval**

#### ARTICLE I: Purpose

The Graduate Group in Microbiology shall establish and administer a graduate program of instruction and research leading to the Doctor of Philosophy degree in microbiology. Upon approval of the research mentor, the Master of Science degree (Plan I) may be offered to entering students, and to current students in good standing that elect not to complete the Ph.D. The interdisciplinary and diverse nature of academic and research interests of the faculty participating in the Graduate Group assures rigorous training for all graduates in microbiology.

#### ARTICLE II: Membership

Members of the Group are actively engaged in teaching and research in microbiology and deemed qualified by the Executive Committee, independent of their department appointment or academic senate membership.

Persons desiring to become a Member of the Group may submit a Curriculum Vitae to the Chairperson of the Group listing their qualifications and stating reasons for wanting to become a Member. These applicants will be evaluated in terms of their research interests, research support, current teaching commitments and potential for graduate student guidance. Each individual's potential for contributing to the curriculum of the Group and graduate student advising will also be considered.

Individual membership in the Group shall be reviewed triennially by the Executive Committee every three years on a rolling basis. To maintain membership, Members must have an active research program, participate in directing the research of graduate students (including rotational training), teach regular graduate level courses germane to microbiology (excluding 290C and 299 listed courses), and serve on administrative or student evaluation committees of the Group. At the time of written notification of review, Members shall supply to the Executive Committee written documentation of their involvement in research training, committee service, and teaching. A Member may resign by written request submitted to the Chairperson of the Group.

#### ARTICLE III: Committee Structure

##### **A. Executive Committee**

Management of the Graduate Group shall be vested in the Executive Committee. An election for members of this committee shall be held at least three weeks before the end of the Spring Term of each odd-numbered year. Election results shall be announced to the Group membership by mail and the newly elected members shall serve a term of two years; members can be elected to serve consecutive terms on the Executive Committee. Interim vacancies in membership of the Executive Committee shall be filled by appointment by the existing Committee.

The Executive Committee shall consist of eight elected faculty members, plus the Chairperson of the Group and a graduate student representative. To ensure broad participation, ideally two members of the Executive Committee shall be elected from faculty in Departments associated with each of the following professional schools and undergraduate colleges: School of Medicine; School of Veterinary Medicine; College of Agriculture and Environmental Sciences; College of Biological Sciences (Colleges of Letters and Science and of Agriculture and Environmental Sciences). However, if this representation is not possible, nominations to fill any position will be taken from the membership at large. A non-voting representative to the Executive Committee shall be elected by members of the Microbiology Graduate Students Association. The Graduate Group chair is nominated by the Executive Committee and the nomination, once approved by the members, sent forward to the Graduate Division. The Chair is appointed by the Chancellor and serves as Chair of the Executive Committee.

The principal responsibilities of the Chairperson of the Executive Committee are to provide academic and administrative leadership to the Group as delineated by the Graduate Council.

The functions of the Executive Committee are: (1) to act as representative in official matters pertaining to the Group, both within and outside of the University; (2) to establish Group policy concerning graduate curriculum and student admissions; (3) to review membership in the Group and maintain a list of active members; (4) to oversee administrative and clerical matters related to activities of the Group; and (5) to appoint members to subcommittees of the Group including (a) Admissions, (b) Educational Policy, and (c) Student Welfare and Advising.

#### B. Admissions Committee

An Admissions Committee shall be appointed by the Executive Committee to recruit and evaluate student applicants to the Group.

The Admissions Committee shall consist of five to seven members, with representation from Departments affiliated with the School of Medicine, the School of Veterinary Medicine, College of Agriculture and Environmental Sciences and College of Biological Sciences. Two members must also serve on the Executive Committee, and one must be from the Microbiology Graduate Student Association. Committee members shall serve a term of two years; each year half of the Committee members shall retire and their places shall be filled by new appointees. Members can be appointed to consecutive terms. A Chairperson and a Vice-Chairperson shall be appointed; the Vice-Chairperson shall succeed the Chairperson during the normal Committee membership rotation. The Chairperson functions as the Admissions adviser of the Admissions Committee, and in their absence, the Chairperson of the Group, shall have the signature authority of recommending graduate student admission to the Graduate Division.

The procedures used to evaluate initial applicants shall be decided by the Admissions Committee, but shall include ranking according to GPA and university affiliation, letters of recommendation, student statement of research and intellectual goals and scores on the verbal, quantitative and analytical sections of the GRE. The Admissions Committee shall evaluate applications from graduate students-in-residence requesting change of major or degree objective on the basis of criteria similar to those of initial applicants.

#### C. Committee on Educational Policy

A Committee on Educational Policy shall be appointed by the Executive Committee to: (1) define and periodically review a graduate curriculum that presents fundamental concepts of modern microbiology; and (2) recommend procedures for, and administration of, the examinations leading to advancement to candidacy in the Doctor of Philosophy degree program. The Committee on Educational Policy shall define the rigor, comprehensive topics, format, and criteria for successful completion of the examinations in the program leading to advancement to candidacy for the Doctor of Philosophy degree.

The Committee on Educational Policy shall consist of five to seven members, including one member each from Departments affiliated with the School of Medicine, School of Veterinary Medicine, College of Agriculture and Environmental Science, and College of Biological Sciences. Two members must also serve on the Executive Committee, and one non-voting member must be from the Microbiology Graduate Student Association. Committee members shall serve a term of two years; each year half of the committee members shall retire and their places shall be filled by new appointees. Members can be reappointed for consecutive terms. A Chairperson and a Vice-Chairperson shall be appointed; the Vice-Chairperson shall succeed the Chairperson during the normal committee membership rotation. The Chairperson and Vice-Chairperson of the Committee on Educational Policy, and in their absence, the Chairperson of the Group, shall have signature authority of recommending membership on examination committees to the Graduate Division.

#### D. Committee on Student Welfare and Advising



A Committee on Student Welfare and Advising shall be appointed by the Executive Committee to coordinate orientation activities for first year students, to provide advice in academic planning to first year and continuing graduate students, and to evaluate and rank fellowship and financial aid applications of continuing students in the Group.

The Committee on Student Welfare and Advising shall consist of six members, including one member each from departments affiliated with the School of Medicine, School of Veterinary Medicine, College of Agriculture and Environmental Science, and College of Biological Sciences. One member must also serve on the Executive Committee, and one non-voting member from the Microbiology Graduate Student Association. The two members from the professional Schools of Medicine and Veterinary Medicine shall be appointed Advisers for students with interest in medical or veterinary medical systems or with major professors from Departments affiliated with those Schools. The two members from the undergraduate College of Agriculture and Environmental Sciences and College of Biological Sciences shall be appointed Advisers for students with research interests in basic microbial systems or with major professors from Departments affiliated with those colleges. \*The Advisers and Committee members shall serve for three years; they may be reappointed for consecutive terms. The Chairperson of the Committee shall be the member appointed from the Executive Committee. (\*Advisers are appointed by the Dean of Graduate Studies for one year renewable terms. The number of advisers will fluctuate with the number of students.)

#### ARTICLE IV: Meetings

A regular meeting of the Graduate Group shall be held annually during the spring quarter. The Chairperson of the Executive Committee shall call meetings of the Group as are deemed necessary or desirable by the Executive Committee. The Chairperson shall call a special meeting of the Group at any time he or she is so requested by written notice from five or more members of the Group. Meetings shall be conducted in accordance with generally accepted procedures including a review of the minutes of the previous meeting, report of the Executive Committee, reports of the subcommittees, unfinished business and new business. At meetings, twenty-five (25) percent of the members of the Group in residence shall constitute a quorum for the conduct of business.

Minutes of each meeting shall be the responsibility of the Chairperson and shall be distributed to the membership within twelve calendar days following the meeting.

#### ARTICLE V: Amendments

Approval of changes in these by-laws shall require a two-thirds majority of the votes cast. Proposed changes shall be submitted to the membership for mail ballot or for vote at a meeting of the Group provided written notice of the proposed changes are sent to the Members of the Group at least one week prior to the date of the meeting.

March 17, 2007

**Graduate Council Guidelines for Authorship**  
(from Graduate Studies Adviser's Handbook 2009, pp. 53-54)

The Graduate Council has addressed the issue of ethics in authorship as it relates to graduate student/major professor interactions (or comparable collaborative author circumstances). The Graduate Council recognizes that faculty or other University researchers may co-author scholarly publications with graduate students and that such collaboration is usually beneficial to all parties involved and should be encouraged. With respect to professional ethics, integrity, and fairness, the authorship of any scholarly work implies the following:

- Each author has made a substantial conceptual contribution to the work.
- Each author accepts responsibility for his/her contribution to the collaborative effort.
- Each author accepts responsibility for the scholarly conclusions appearing in the publication.

***Definition of "Substantial Conceptual Contribution"***

"Substantial conceptual contribution" is interpreted by the Graduate Council to mean input beyond that of: (1) only providing instruction, (2) granting use of laboratory space or equipment, (3) provision of financial support, or (4) dissertation guidance by a faculty member. Thus, "substantial conceptual contribution" means making a theoretical contribution to the work and/or a considerable degree of involvement with its development such as: the generation and interpretation of data, the drawing of conclusions, or the actual writing of the manuscript.

***Definition of "Responsibility"***

"Responsibility" means that an author understands: the methodology involved, the relationship to other similar research, and the significance and implications of his/her contributions to the publication. Responsibility requires that the individual is able to defend his/her contribution against academic challenge. Students or faculty should not take authorship if they: do not understand these aspects of the work, are unwilling to accept responsibility for them, or do not agree with the conclusions made in the report.

## MENTORING GUIDELINES

(from Graduate Council guidelines for graduate students)

Graduate Council recognizes that the mentoring of graduate students by faculty is an integral part of the graduate experience for both. Faculty mentoring is broader than advising a student as to the program of study to fulfill coursework requirements and is distinct from formal instruction in a given discipline.

Mentoring encompasses more than serving as a role model. Because of the uncertainty as to the nature of mentoring, the UC-Davis Graduate Council has outlined the following mentoring roles to guide the relationship between faculty and graduate students. Faculty and graduate students must realize that, while the major professor will be the primary mentor during a student's career at UCD, many of the mentoring "functions" defined below may be performed by program faculty other than the major professor. An important corollary to this recognition is that faculty members must realize that much of their interaction with all students has an important mentoring component to it. Graduate students also have responsibilities to insure successful mentoring and these are also indicated below.

*Faculty have a responsibility to mentor graduate students. Mentoring has been defined as....*

I. Guiding students through degree requirements. This means:

1. Providing a clear map of program requirements from the beginning, making clear the nature of the coursework requirements and qualifying examination, and defining a timeline for their completion.
2. Providing clear guidelines for starting and finishing dissertation or thesis work, including encouraging the timely initiation of the dissertation or thesis research.

II. Guiding students through thesis or dissertation research. This means:

1. Evaluating clearly the strengths and weaknesses of the student's research.
2. Encouraging an open exchange of ideas, including pursuit of the student's ideas.
3. Checking regularly on progress.
4. Critiquing written work.
5. Providing and discussing clear criteria for authorship of collaborative research.
6. Assisting in finding sources to support dissertation research; such as, teaching assistantships, research assistantships, fellowships, etc.
7. Being aware of student's research needs and providing assistance in obtaining required resources. For example, serve as the student's advocate for necessary desk and/or laboratory space.

III. Guiding students through professional development. This means:

1. Providing guidance and serving as a role model for upholding the highest ethical standards.
2. Treating students respectfully.
3. Encouraging and critiquing oral and written presentations.

4. Encouraging participation in professional meetings of regional groups as well as of learned societies.
5. Facilitating interactions with other scholars, on campus and in the wider professional community.
6. Assistance with applications for research funding, fellowship applications, and other applications as appropriate for the respective discipline.
7. Being the student's advocate in academic and professional communities.
8. Providing career guidance, specifically assistance in preparation of CV and job interviews, and writing letters of recommendation in a timely manner.
9. Recognizing and giving value to the idea that there are a variety of career options available to the student in her/his/your field of interest and accepting that the student's choice of career options is worthy of your support. For example, guiding the student to teaching opportunities when appropriate for the student's goals.

*As partners in the mentoring relationship, graduate students have responsibilities.*

*As mentees, students should:*

- I. Be aware of their own mentoring needs and how they change through their graduate tenure. Graduate students should discuss these changing needs with their mentors.
- II. Recognize that one faculty member may not be able to satisfy all of a student's mentoring needs. Seek assistance from multiple individuals/organizations to fulfill the mentoring roles described above.
- III. Recognize that their mentoring needs must respect their mentor's other responsibilities and time commitments.
- IV. Maintain and seek regular communication with their mentors, especially their major professor.

While we have tried to provide examples of what mentoring means, we recognize that each discipline will provide its own special set of mentoring needs and challenges. We recommend that each graduate program meet to define what "good mentoring" means to and for its faculty and graduate students.

Approved by UC Davis Graduate Council  
June 24, 1999

